NATURAL RESOURCES CONSERVATION SERVICE
ARKANSAS INTERIM PRACTICE STANDARD

ALUM TREATMENT OF POULTRY LITTER
(No. of Houses Where Practice Is Applied)
CODE 786

DEFINITION

Applications of aluminum sulfate to poultry manure.

PURPOSE

To convert phosphorus in poultry litter into a less soluble form in order to reduce the concentration of phosphorus in runoff from fields where poultry litter is applied.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to poultry litter that is to be spread on land where soil phosphorus is sufficient for the planned vegetative use.

CRITERIA

Apply alum to the litter remaining in the house after the removal of the flock unless prior to a total clean out. "De-cake" or till the litter with a rotary tiller before alum is applied. Apply alum uniformly at a rate of 100 to 200 pounds of alum per ton of litter, (see Table 1). Thoroughly incorporate alum into the litter before introducing the next flock to prevent direct exposure of the alum to young birds.

Liquid alum may be used in place of dry alum. There are two forms of liquid alum - normal liquid alum and acid liquid alum. To achieve equivalent results of one ton of dry alum apply 370 gallons of normal liquid alum or 512 gallons of acid liquid alum, (See Table 2). (Note acid liquid alum is very corrosive. Use caution and strict adherence to manufacturer's recommendations when using acid liquid alum.)

Consider using the dry form of alum when litter is damp and drying conditions are poor, such as on cold, damp winter days. If the dry form is unavailable, consider de-caking wet spots, adding additional litter, conditioning remaining litter and taking other steps to speed drying.

The treated litter must be applied to the land or otherwise managed according to a nutrient management plan that accounts for the additional nitrogen retained in the alum treated litter and the amount of phosphorus being precipitated from the litter. The Arkansas Phosphorus Index should be run to account for the amount of phosphorus being precipitated by alum added to the litter.

The amount of nitrogen should be increased by 30% due to reduced volatilization of nitrogen into ammonium gas.

Wear goggles for eye protection and a mask to prevent inhaling dust when applying alum and incorporating it into poultry litter. Wear gloves when handling alum to prevent skin burns or irritation. Persons working with this chemical should be properly trained regarding its hazards and its safe use.

All federal, state and local government requirements must be adhered to.

CONSIDERATIONS

For application computations it may be estimated that a ton of litter is produced for every 1,000 four pound broilers removed from a poultry house.
Total phosphorus precipitation increases linearly with an increase in the rate of alum

applied.

Applications of alum treated litter may result in lower field concentrations of soluble arsenic (As), copper (Cu), iron (Fe), and zinc (Zn) that applications of non-treated litter.

Applications of alum treated litter may result in higher field concentrations of soluble calcium (Ca), and magnesium (Mg) than applications of non-treated litter.

Applications of alum will result in lower concentrations of ammonia (NH_3) in the air in the poultry house.

PLANS AND SPECIFICATION

Specifications for this practice will identify (1) the poultry houses where the litter is to be treated, (2) the amount of alum to be added for each treatment, (3) the equipment needed to add and incorporate the alum into the litter, (4) appropriate handling, application, and incorporation procedures, and (5) the fields where the treated litter will be applied

OPERATION AND MAINTENANCE

Operation and maintenance criteria are not applicable to this practice.

References

Agronomy Technical Note No. 3, “Treating Poultry Litter with Alum” dated May 6, 2003.

Agricultural Waste Management Field Handbook, April 1992.

Table 1

Estimate of the amount of alum to be applied to 40' X 400' poultry houses with an average of 17,000 birds.

Bird Market Weight	Bird Average Weight	No. of Flocks	Litter Produced Per 1000 Birds	Litter (Tons)	Alum Applied Per Application (Tons)		
					@100 lbs/Ton	@150 lbs/Ton	@200 lbs/Ton
2	1.2	8	0.45	7.7	0.38	0.57	0.77
4	2.6	6	1.00	17.0	0.85	1.28	1.70
6	4.2	5	1.50	25.5	1.28	1.91	2.55
8	5.6	4	2.00	34.0	1.70	2.55	3.40

Estimate of the amount of alum to be applied to 40' X 500' poultry houses with an average of 21,000 birds.

Bird Market Weight	Bird Average Weight	No. of Flocks	Litter Produced Per 1000 Birds	Litter (Tons)	Alum Applied Per Application (Tons)		
					@100 lbs/Ton	@150 lbs/Ton	@200 lbs/Ton
2	1.2	8	0.45	9.5	0.47	0.71	0.95
4	2.6	6	1.00	21.0	1.05	1.58	2.10
6	4.2	5	1.50	31.5	1.58	2.36	3.15
8	5.6	4	2.00	42.0	2.10	3.15	4.20

Estimate of the amount of alum to be applied to 40' X 600' poultry houses with an average of 25,000 birds.

Bird Market Weight	Bird Average Weight	No. of Flocks	Litter Produced Per 1000 Birds	Litter (Tons)	Alum Applied Per Application (Tons)		
					@100 lbs/Ton	@150 lbs/Ton	@200 lbs/Ton
2	1.2	8	0.45	11.3	0.56	0.84	1.13
4	2.6	6	1.00	25.0	1.25	1.88	2.50
6	4.2	5	1.50	37.5	1.88	2.81	3.75
8	5.6	4	2.00	50.0	2.50	3.75	5.00

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Table 2

Conversion of dry alum to normal liquid and acid liquid alum.

Dry Alum (Tons)	Normal Liquid Alum (Gal) (48.5% Alum by Weight)	Acid Liquid Alum (Gal) (36% Alum by Weight)
0.25	93	128
0.50	185	256
0.75	278	384
1.00	370	512
2.00	740	1024
3.00	1110	1536
4.00	1480	2048
5.00	1850	2560
6.00	2220	3072

Weight of Dry Alum = 5.41#/gal, Total Weight Of Normal Liquid Alum = 11.15#/gal (**48 1/2 %**)
Weight of Dry Alum = 3.91#/gal, Total Weight Of Acid Liquid Alum = 10.85#/gal (**36 %**)